

LOUISIANA MONTHLY MORBIDITY LHSRSA

DISEASES REPORTED DURING THE MONTH OF **DECEMBER, 1973** BY PARISH OF RESIDENCE

THE RISK OF RABIES PROPHYLAXIS VS THE RISK OF THE DISEASE

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Each month Louisiana practitioners call on the Epidemiology Section of the LHSRSA for assistance in making the difficult decision of whether or not to give anti-rabies treatment to patients who have had some "unusual" animal exposure. Frequently, these decisions are reached

tentatively and then, only after considerable collective agonizing. Since no reliable means are currently available for detecting the rabies virus in an individual prior to development of disease, the physician finds himself "playing the odds" in each of these cases. That is, he must decide

BUREAU OF VITAL STATISTICS DIVISION OF HEALTH MAINTENANCE AND AMBULATORY PATIENT SERVICES

Prepared by: DIVISION OF TABULATION & ANALYSIS	BUREAU OF VITAL STATISTICS DIVISION OF HEALTH MAINTENANCE AND AMBULATORY PATIENT SERVICES																		
	ASEPTIC MENINGITIS	DIPHThERIA	ENCEPHALITIS	ENCEPHALITIS, POST INFECTIONOUS	INFECTIOUS AND SERUM HEPATITIS	TUBERCULOSIS, PULMONARY	MENINGOCOCCAL INFECTIONS	PERTUSSIS	POLIOMYELITIS, PARALYTIC	RABIES IN ANIMALS	RHEUMATIC FEVER	RUBELLA *	SHIGELLOSIS	TYPHOID FEVER	OTHER SALMONELLOSIS	TETANUS	MEASLES	GONORRHEA	SYPHILIS, PRIMARY AND SECONDARY
TOTAL TO DATE 1972	94	6	15	9	737	589	51	44	0	49	16	100	305	7	213	6	112	17275	854
TOTAL TO DATE 1973	112	0	17	4	937	529	51	12	0	52	27	101	239	6	282	4	91	23544	794
TOTAL THIS MONTH	4	0	0	0	86	41	4	0	0	2	2	1	23	0	57	0	4	2106	38
ACADIA					3	2													7
ALLEN						1													3
ASCENSION					1														4
ASSUMPTION																			5
AVOUELLES																	1		16
BEAUREGARD																			3
BIENVILLE																			
BOSSIER					2	1													11
CADDO					7	5													149
CALCASIEU						3									2				59
CALDWELL										1									1
CAMERON																			
CATAHOULA																			4
CLAIBORNE																			5
CONCORDIA															1				1
DESOTO					1								1						22
EAST BATON ROUGE					4	5									3		2	131	3
EAST CARROLL																			8
EAST FELICIANA																			4
EVANGELINE																			7
FRANKLIN					1														12
GRANT					1														4
IBERIA					1	1													8
IBERVILLE																			6

*Includes Rubella, Congenital Syndrome.

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JACKSON					1														2	
JEFFERSON	1				10	1	2						3		16				196	5
JEFFERSON DAVIS					1														7	
LAFAYETTE					6										1				24	1
LAFOURCHE					1					1									16	1
LASALLE																			2	
LINCOLN					1														55	
LIVINGSTON																			5	
MADISON					1														11	2
MOREHOUSE																			6	
NATCHITOCHEs					1														45	1
ORLEANS	3				13	9				1	1	18		30			1		780	10
OUACHITA					3	3	1			1					1				67	1
PLAQUEMINES					1								1						5	
POINTE COUPEE																			2	
RAPIDES					3	1													88	1
RED RIVER																			3	
RICHLAND																			16	
SABINE																			3	
ST. BERNARD					2	3	1								1				6	
ST. CHARLES					1														5	
ST. HELENA																			2	
ST. JAMES																			4	
ST. JOHN																			5	
ST. LANDRY																			58	3
ST. MARTIN						4									1				8	
ST. MARY					1														12	
ST. TAMMANY					5														26	
TANGIPAHOA					3	2													28	6
TENSAS																				
TERREBONNE					3														4	
UNION																			10	
VERMILION					1														3	1
VERNON					3														50	1
WASHINGTON					2										1				1	
WEBSTER					1														20	
WEST BATON ROUGE																			2	
WEST CARROLL					1														7	
WEST FELICIANA																			37	
WINN																			13	
OUT OF STATE																			2	

From January 1 through December 31, the following cases were also reported: 3-Actinomycosis; 6-Brucellosis; 2-Malaria (contracted outside the U.S.A.). From February 24 through December 31, 55 cases of undernutrition were reported ("anemia" was specified on 30 of these).

whether the risk of rabies to his patient and its universally grim outcome outweigh the relatively small though significant risk of adverse reaction to his treatment. This report has been prepared in an attempt to review some of the basic concepts of rabies prophylaxis in the hope that these will be of some value to Louisiana physicians in dealing with decisions regarding treatment of animal bites in their particular community.

More severe reactions have been associated with rabies vaccines than with almost any other vaccine. This is primarily due to the fact that in order to achieve an adequate antibody response a large quantity of rabies antigen must be administered to the subject during a relatively short period of time. Any animal tissue which contains the inactivated rabies virus may be used to stimulate an appropriate immune reaction. At the present time, however, the only commercially available rabies vaccine for human use in the United States is the duck embryo vaccine (DEV) prepared from embryonated duck eggs infected with fixed virus which is then inactivated with B-propiolactone.

Neurologic complications associated with this vaccine have been reported to occur at a rate of 1 per 25,000. Only 1 questionably related death among over 200,000 persons treated with the vaccine has been reported. Erythema, pruritis, pain, and tenderness at the site of inoculation are common. Systemic responses, including low-grade fever and shock, occasionally occur late in the course of therapy (usually after 5-8 doses).

The best specific post-exposure prophylaxis is a combination of vaccine and hyperimmune serum. The only preparation of currently available antirabies serum in the United States is of equine origin. This induces serum sickness in at least 20 percent of those who receive it, and the risk of serum sickness increases with the age of the patient.

The likelihood of a person exposed to rabies developing the disease is not yet known, nor is it known to what degree post-exposure prophylaxis is effective in reducing the risk of disease. The only worthwhile data relating to these questions were reported by Veeraraghavan (1963) in India.(1)

Table 1
ANIMAL BRAINS
EXAMINED BY THE LOUISIANA STATE LABORATORY
1950 - 1972

ANIMAL*	TOTAL	POSITIVE	ANIMAL	TOTAL	POSITIVE
Dog	16,036	1,305	Guinea Pig	103	0
Cat	8,468	61	Mink	70	0
Fox	1,590	959	Nutria	59	0
Squirrel	1,452	1	Bird	50	0
Rat	1,187	1	Gopher	30	0
Cattle	438	76	Muskrat	28	0
Bat	583	51	Mole	27	0
Skunk	259	48	Chipmunk	34	0
Equine	44	4	Gerbil	60	0
Wolf	42	7	Deer	9	0
Swine	25	2	Salamander	8	0
Goat	20	4	Armadillo	9	0
Bobcat	14	1	Sheep	4	0
Hamster	1,092	0	Otter	6	0
Rabbit	846	0	Bear	4	0
Mouse	401	0	Weasel	4	0
Raccoon**	326	0	Coati	2	0
Monkey	179	0	Shrew	1	0
Opossum	165	0	Woodchuck	1	0
Beaver	1	0	Chinchilla	1	0

* The last case of human rabies occurred in Louisiana in 1953.

** In 1973, Louisiana's first confirmed positive raccoon was reported from Catahoula Parish.

In his investigation he examined the mortality rates among 734 persons bitten by a known rabid animal during the period 1946 to 1962. Of these persons 153 received no post-exposure prophylaxis and 77 (50.35%) of these died. During the same period there were only 49 deaths among 581 (8.4%) persons who received a complete series of vaccine (without serum). The combined use of antirabies serum plus vaccine is even more effective than vaccine alone. In the eastern Mediterranean countries, where prior to the use of this combination many cases of rabies occurred each year, now human rabies has been virtually eliminated.

The decision of whether or not to administer vaccine (or serum plus vaccine) to persons bitten, scratched, or otherwise exposed to an animal is often a difficult one for the attending physician. Furthermore, the decision must be made immediately for maximum effectiveness of the treatment. The decision is not a difficult one if the exposure is by bite of an animal proven rabid by laboratory examination. All such persons should receive both serum and vaccine immediately. All persons bitten by wild foxes, skunks, bats, and raccoons, especially if unprovoked and in an infected area, should immediately receive serum plus vaccine unless the animal is killed and examined at once, and found negative by fluorescent antibody techniques. Likewise, an unprovoked bite by a dog or cat that escapes capture, particularly in an infected area, should be regarded as rabid and the individual given serum plus vaccine.

A healthy domestic dog or cat that bites a person may be captured, confined, and observed by a veterinarian for 10 days. At the first sign suggestive of rabies, the dog or cat should be sacrificed and the head carried or shipped refrigerated (not frozen) to the state laboratory. If the owner agrees, the animal may be sacrificed at anytime before developing signs of the disease, and examined by the FA technique. Biting wild or stray animals should be killed immediately and examined using the FA technique, since early signs of rabies in these animals can not be interpreted reliably. Prior to the development and evaluation of the FA technique for rabies diagnosis, it was unwise to sacrifice a captured animal before onset of symptoms. This was to allow time for development of Negri bodies which become more prevalent as the disease progresses. This is not necessary when the FA technique is utilized.

It is not possible to describe all of the difficult situations which require careful evaluation by the physician in deciding whether to

to treat or not to treat. "Difficult situations," however, almost always involve animals that have escaped. The physician must then consider the following facts and weigh these as they relate to his patient in making his decision:

Carnivorous animals, especially dogs, cats, foxes, skunks, raccoons, coyotes, and bats, are the most commonly infected of all animals. Bites of rabbits, squirrels, rats, mice, pet quinea pigs, and hamsters seldom, if ever, require rabies prophylaxis. The likelihood that rabies will result from exposure to a rabid animal varies directly with the nature and extent of the exposure, being lowest with minor scratches and abrasions and highest with multiple penetrating wounds caused by the teeth of the rabid animal. Immediate first aid treatment (copious flushing with soap and water) and the use of quaternary ammonium compounds (after all traces of soap have been removed) are the most effective means of preventing rabies and will reduce the risk of disease accordingly.

Where there is proof that the biting animal was properly immunized, this animal becomes an unlikely vector for rabies. The circumstances leading to the animal bite are equally important. Was the animal "teased"? Was he feeding? Was the animal injured? Had the animal bitten or attempted to bite people before? These are all important questions since provoked attacks are less significant than are unprovoked attacks.

The prevalence of rabies in the area where the attack occurs is an important consideration in determining the risk of an exposure. The geographic distribution of laboratory proven cases of rabies in Louisiana from 1968 through 1972 is shown in Figure 1. With the exception of a few positive insectivorous bats, South Louisiana has been almost completely free of rabies during this period. The epidemiological significance of insectivorous bat rabies in areas otherwise free of rabies has not been fully determined. They can transmit the disease to man by bite; however, natural transmission to other ter-

Table 2
POST-EXPOSURE ANTIRABIES GUIDE⁽²⁾

ANIMAL AND ITS CONDITION		TREATMENT	
Species	Condition at Time of Attack	KIND OF EXPOSURE	
		Bite	Non-Bite
Wild	Skunk	S + V ¹	S + V ¹
	Fox		
	Raccoon		
	Bat		
Domestic	Dog	Healthy	None ²
		Escaped (unknown)	S + V
	Cat	Rabid	S + V ¹
Other		Consider individually - See discussion	

V Rabies Vaccine

S Antirabies Serum (when serum is used 21 doses of vaccine are recommended plus 2 booster doses at 10 and 20 days after completion of the primary course).

1 Discontinue vaccine if fluorescent antibody (FA) test of animal killed at time of attack is negative.

2 Begin S + V at first sign of rabies in biting dog or cat during holding period (10 days)

3 14 doses of DE V

restrial animals by their bite has not been observed. In 1972, bats were the only recorded animals with rabies in 14 states. To illustrate the relative importance of the various animal species as sources of rabies, examinations for rabies by health department laboratories in Louisiana from 1950 through 1972 are presented in Table 1. The most striking aspect of these data is the number of species without any detectable rabies. Many of these species, such as hamsters, rabbits, and mice, have been examined in great numbers without a single positive animal being recorded.

Rat and squirrel bites are frequent and difficult problems for physicians. Only one case of rabies in each of these species has been recorded, despite the thousands of specimens that have been examined. The single positive squirrel noted in Table 1 was well documented by demonstration of Negri bodies and by FA and mouse inoculation test. Although the animal bit no one, it was examined because it demonstrated symptoms of paralytic disease and was discovered in an area of North Louisiana with known endemic rabies. The positive rat seen in the same table occurred many years ago and was diagnosed on the basis

of identification of Negri bodies. This specimen was not examined by FA or mouse inoculation test. Since "non-specific" inclusion bodies sometimes found in rodent brain specimens have been confused with Negri bodies of rabies, the validity of this report is doubtful. There has never been a reported case of human rabies in the United States due to the bite of a rodent. Furthermore, most rodents are not particularly susceptible to the rabies virus, according to experimental data, and when they are infected the virus usually does not invade the salivary glands.

The United States Public Health Service recommendations for post-exposure antirabies prophylaxis are presented in Table 2 as a brief summary of many of the important points of this article (note: "bite" refers to any penetration of skin by teeth whereas "non bite" includes scratches, abrasions, or other open wounds.) These recommendations, as stressed elsewhere in the discussion, represent only a guide. As such they should be used with knowledge of the animal species involved, circumstances of the bite or other exposure, vaccination status of the animal, and presence of rabies in the region.

(1). Veeraraghavan, N: The value of 5 percent semple vaccine in human treatment, Scientific Annual Report, The Pasteur Institute of Southern India, Coonor, 1963.

(2) Immunization - against disease - 1972, Publication of the Center for Disease Control, Atlanta, Ga.